

Rise of Melatonin Supplementation: Results, Side Effects, and Concerns

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Introduction

In the ever-evolving field of modern health and wellness, melatonin has become a more popularized term. Diving deeper, it is important to note that there are two different types of melatonin. The human body naturally produces melatonin and there are the melatonin supplements that one can take. Natural production of melatonin plays a crucial role in aiding in one's ability to fall and stay asleep. Melatonin supplements are on the rise and starting to become a major contributor in the average person's ability to have a good night's sleep. This paper aims to draw attention to the unknown side effects and concerns that arise when taking melatonin.

Melatonin is a hormone that our bodies naturally produce to control sleep-wake cycles.¹ It is produced by the pineal gland located in the middle of the brain and regulated by visual light cues. Melatonin serum levels start to rise in the evening and decline during the day. The level of melatonin in the body is at an all time high between the ages of one to five and drops seventy-five percent throughout childhood until young adulthood.² Even though melatonin has been widely fixated to regulate sleep, there have been new discoveries on the other purposes of melatonin. These include immune regulation, antioxidant defense, and even aiding in the aging process.^{3,4} Only in the last so many years have people transitioned from talking about the body's production of melatonin to melatonin supplements.

The melatonin supplement consumption percentage increased significantly from 2000 to 2018. The overall reported use of a standard dose of five milligrams of melatonin increased from 0.4% to 2.1%.³ This trend was similar across all sex and age groups. Similarly, there was also an increase in the use of melatonin for doses over five milligrams. More recently, the pandemic and its lasting effects on mental health and sleep disturbances have brought a new spark to the melatonin market. Melatonin sales more than doubled from 2017 to 2020.⁴ Even in countries

where melatonin is only used as a prescription, there has been an increase in its use. Countries in Northern Europe where melatonin is only available with a doctor's order have seen a significant increase in the number of prescriptions for melatonin amongst children and adolescents.⁵ What is it about this product that makes it so appealing to users?

Melatonin Supplements

Melatonin supplements come in a variety of forms and strengths. It can be taken as a gummy, tablet, or be dissolved under the tongue at strengths ranging from one to twelve milligrams.⁶ The most widely known benefit of taking melatonin supplements is its ability to reduce insomnia and other sleep related disorders.⁷ Marketed as a natural solution to sleep disturbances, melatonin has gathered the attention of those looking for a quick fix for their insomnia. It can assist individuals in achieving faster sleep onset and maintain uninterrupted sleep throughout the night. Studies have shown that even a small, one milligram dose of melatonin can have significant effects and improve a person's quality of sleep.² It is recommended to not go over five milligrams when taking it consistently.

Negative Side Effects

Since melatonin can easily be picked up anywhere in the United States, many people do not realize the impact it can have on the other medications they are taking. When using melatonin with other prescriptions, it can change the way the other medications work and inhibit the desired outcome of that medication.⁶ One specific example mentions, "Melatonin has been shown to reduce the efficacy of the calcium channel blocker nifedipine".⁸ Nifedipine works by relaxing the muscles of the heart to lower blood pressure, so taking melatonin could undo the work of the nifedipine and cause great harm to the individual. Furthermore, there have been cases reported of increased bleeding due to taking melatonin while on the warfarin medication.⁸

These are not the only medications that are affected by melatonin. It is essential to consult a doctor before purchasing melatonin, as several other medications could be adversely impacted by its consumption.

On the other hand, melatonin has been seen to reduce sleep disturbances in children with neurological disabilities. However, the use of melatonin seemed to increase seizure activity amongst five of the six participants in a study done by Stephon Sheldon.⁹ The seizure activity returned to pre-melatonin levels when melatonin consumption stopped. Even when rechallenged with a smaller dose, the seizure activity increased again. Another similar article states, “There may be an increased risk of adverse neurological effects in those with significant organic brain injury...”.⁸ This is a prime example of why someone should not buy and consume melatonin without consulting a doctor first.

Along with these effects, there are also concerns of melatonin affecting the pubertal timing in children. Melatonin levels in the human body are at an all time high when they are young and drop 80% throughout childhood until adolescence between the ages of fifteen and twenty.² This melatonin drop parallels the sexual maturation process. As melatonin levels in the body naturally decrease, a person starts going through puberty. It has been hypothesized that keeping these levels high by the use of melatonin supplements could prevent important pubertal developmental steps.⁷ However, the relationship between taking melatonin supplements and sexual maturation is understudied and more research is necessary.

In addition to these very specific side effects, there are some mild side effects that occur in the general population. These include dizziness, nausea, next-day drowsiness, headaches, and more.^{1,6,7} Research indicates that these side effects disappear once discontinuing the use of

melatonin supplements. However, these side effects are usually mild enough to not discourage the use of melatonin in the individual.

General Concerns

Along with the possible negative side effects of taking melatonin, there is concern over the use of melatonin itself. The content of melatonin in a supplement is not always accurate to the label and “was found to range from -83% to +478 of the labeled content”.^{4,10} This means that the melatonin content inside the wide variety of melatonin supplements tested varied significantly. If someone is intending to take two milligrams of melatonin, there is a good chance that they are not actually ingesting the intended dose.

On top of this, most people do not research a supplement well enough before taking it and this applies to melatonin as well. As mentioned before, melatonin is sold in a wide variety of concentrations from one to twelve milligrams. Do people even know the recommended starting dose for melatonin? An article on integrative health states, “Initial recommended starting doses of melatonin in older adults are 0.3 to 2 mg of immediate-release formulation melatonin...”.¹ Smaller doses are recommended and said to be just as effective as higher doses.⁷ More studies have been done on smaller doses that are less than five milligrams and conclude that these moderate doses appear to be safe. The higher doses, on the other hand, have been scarcely studied. Research cannot prove that higher doses of melatonin are safe or effective for all people and their uses.⁶

There is also the question of why melatonin supplements are over the counter in the United States, but only used as prescriptions in other countries. In Sweden, for example, melatonin is a prescription medicine and cannot be purchased over the counter whereas the United States classifies melatonin as a dietary supplement that does not require a prescription.^{5,7}

In contrast to this, melatonin use isn't even approved in Japan as over the counter or with a prescription.⁸ With no clear answer as to why some countries have it over the counter and others have it as prescription only, there are concerns that rise from being available to everyone. In countries that regulate melatonin as a dietary supplement, one being in the United States, there is greater risk for inappropriate use while lacking certain medical supervision that prescriptions have.⁸

Along with lacking medical regulation, there is no way to stop the unnecessary use of melatonin. Struggling to fall or stay asleep is a common occurrence in children and some people's immediate response is to give children melatonin without knowing the consequences. National poison centers have reported an increased number of instances of melatonin exposure in children under the age of five.⁴ Researchers and health professionals alike conclude that these issues should be treated non-medically.^{4,5} Children possess higher levels of melatonin in the body compared to adults, resulting in reduced needs for melatonin supplements.⁴ There are natural remedies to aid in falling asleep like limiting screen time before bed, staying active during the day, and avoiding chemicals like caffeine that disrupt sleep. These are safer and more effective long term lifestyle changes one can make to regulate their sleep-wake cycles.

Conclusion

In summary, the surge in interest and consumption of melatonin supplements have heightened the growing concern and fascination with sleep quality and overall wellness in modern society. While the natural production of melatonin in the human body plays a vital role in regulating sleep-wake cycles, the rise of melatonin supplements offers a convenient solution for individuals struggling with sleep disorders or seeking to optimize their sleep patterns. However, there are some concerns when taking melatonin. The potential interactions between

melatonin supplements and other medications raise the need for caution as they can impact the effectiveness of other treatments. Moreover, melatonin may cause adverse effects such as increased seizure activity in those with neurological disabilities. There is also the inconsistency in the melatonin content in these supplements and the concern of regulatory approaches across countries. Therefore, while melatonin supplements offer promise for enhancing sleep, cautious use and informed decision-making are essential. Melatonin still requires significantly more research to be done on the positive and negative effects of melatonin and how it can impact people in the short and long run. Consulting healthcare professionals and doing personal research is crucial for maximizing benefits while minimizing risks associated with taking melatonin supplements.